

out the characters in which the fossils agreed with, and those in which they differed from, *Balæna*, asserted that in those particular respects the animal to which the remains belonged agreed with a genus of whales which he had just described under the name of *Macclayius*, from a specimen in the Australian Museum in Sydney. Perhaps Prof. Flower regards these vertebrae as not those of a cetacean at all; but if he agrees with the authorities just named on that point, the case seems to resolve itself into this, viz. either this whale lived in Mesozoic times, or its remains have come from some Tertiary formation. If the former, and particularly if its age is, as regarded by Prof. Sedgwick and Prof. Seeley, Jurassic, Prof. Flower's hypothesis of the evolution of the Cetacea from the Ungulates is hardly probable, when we consider the known facts as to the development of that group during the Tertiary period, even if we allow for whatever weight *Stereognathus* may afford of an approach to an Ungulate type in Jurassic times. If the latter, and these remains came originally from some older Tertiary formation, it follows that such a formation has, though no traces of it are now to be found, once existed in the area between Ely and the eastern watershed of the Pennine, because the whole of the material of the clay in which the remains were found is made up of the wreck of formations from that area alone.

SEARLES V. WOOD

Martlesham, near Woodbridge, December 6

"Cosmic Dust"

THE report on Baron Nordenskjöld's expedition to Greenland this year, recently given in *NATURE*, undoubtedly contains important results as to the physical geography of that country. Its statements, of course, will require a more detailed explanation than this preliminary report can give; one statement especially, on account of its significance, induces me to call the reader's attention to a fact which it will be necessary to take into consideration in discussing the question.

The statement is contained in the following words at the end of the article:—"I hope when this (viz. the dust found on the inland ice) has been exhaustively analysed, to be able to furnish fresh proofs in support of the theory that this deposit is, at all events partly, of cosmic origin, and thereby contribute further materials for the theory of the formation of the earth."

The fact to which I have alluded is this: Next to the observations furnished by travelling over the inland ice, it appears to me that an examination of the fresh and pure fragments of it from the very interior of the country, which are pushed out in the shape of icebergs, must give the best key to the solution of the problem. We know that the mass of which these bergs are fragments is formed of snow accumulated during hundreds of years, and it has taken hundreds of years for the ice thus formed in the central regions to travel to the seashore. Consequently the dust which during the lapse of centuries has fallen upon the surface of the glacier must have been mixed up with the snow, and thereby spread over or embedded in the chief mass that constitutes the bergs.

As to my own observations, I have always found the chief mass that constitutes the large bergs to exhibit the appearance of perfectly pure ice, only permeated with thin air-bubbles, and the earthy matters of the bergs distinctly confined to isolated dykes, layers, conglomerates, or even to entire smaller bergs issuing from certain fjords. But I confess that my attention never was directed to a more minute investigation of the chief berg ice, and still less to the problem here mentioned. I do not remember to have seen anything mentioned by my friends Steenstrup, Helland, and Hammer that could throw sufficient light upon this question. I therefore here present it to your readers who are experienced in Arctic researches and may feel inclined to communicate their opinions upon it.

Christiania, Norway, December 5

HENRY RINK

On the Incubation Period of Scientific Links

THE length of the dormant period during which a certain class of scientific discoveries has to remain unrecognised before they are made available is a subject that may form an interesting chapter in the history of science. I will cite one or two examples, in one of which I am personally interested, as illustrating my meaning, particularly as I think they will enable me to point out the cause of this strange anomaly at a time when so much attention is being given to original research, and yet which will leave the results of original research to lie dormant for

years after they have been realised. As illustrating the fact that most important laws may remain for many years dormant, I have but to cite the law of Avogadro, which remained unnoticed for fifty years, until the investigations of Dumas proved it to be a most important aid in chemical research. The law of Dulong and Petit on the connection between the specific heat and the atomic weight of the elements had to pass through a dormant period of more than twenty years before it was resuscitated by the experiments of Regnault. More than forty years ago I announced a new law connecting the physiological reactions of inorganic substances with their isomorphous relations. This law, although founded on an extensive series of experiments, and since verified by the investigation of the action of the compounds of more than forty of the elements, has up to the present time remained entirely dormant, not having been noticed, as far as I am aware, by any writer on physiology. A French chemist, M. Rabuteau, has recently very cavalierly consigned it *aux baggages du passé*, apparently under the idea that it is a revival of the hypothesis that connected the action of poisons with the more or less acute angles of their crystals. Now, however, the important part played by these inorganic substances as physiological reagents is beginning to be recognised (see Ringer, *Journal of Physiology*, January and August, 1883; Brunton and Cash, *Proc. Roy. Soc.*, vol. xxxv.).

The question presents itself as to what there is peculiar in these laws which distinguishes them from those which find an immediate recognition by men of science. I think the distinction will be found in the fact that these hibernating laws generally form connecting links between two branches of science which had not, up to the time of the discovery of these laws, been of much mutual assistance. The law of Avogadro, for example, established a new link between chemistry and physics, and for its application the chemist had to be familiar with the manipulations required for the determination of the density of vapours and gases, a subject scarcely alluded to in treatises on chemistry at the beginning of the century. The law of Dulong and Petit forms another link between chemistry and physics, requiring for its verification methods which, at the time of its discovery, were almost exclusively in the hands of physicists. As for the law connecting the physiological action of a substance with its isomorphous relations, when it was first published the distance between chemistry and physiology was greater than that between physics and chemistry at the time of the discovery of Avogadro, and should the subject be already attracting the attention of physiologists, after a latent period of but forty-four years, this fact affords evidence that science is now advancing at a more rapid rate than formerly. The question is an interesting one as to the possibility of something being done to shorten the period during which these linking laws remain unrecognised. Offering, as they generally do, important aids for the advancement of science, it certainly is desirable that some means might be taken to prevent their being shelved amongst *les baggages du passé*, so that at some future period the whole subject has to be gone over *de novo*. In the case of physiological discoveries, it certainly would seem to be the duty of the Antivivisection Society to see that the many experiments which had been performed to verify them were made available, so that a great deal of vivisection might thus be avoided without the progress of science being retarded.

JAMES BLAKE

San Francisco, November 13

Meteor

THIS afternoon, at 5.27 p.m., I observed here a meteor of great brilliancy, a note of which may be worth publishing. The moon, within three days of being full, was shining unclouded, and the western sky was still glowing with the fading tints of another gorgeous cloud-glow, when a bright light caused me to look up. It was due to a bright meteor a few degrees south of and below the moon. Its path was about 20° in length between south-east and south, inclined at an angle, roughly speaking, of 10° to the horizon, its mean altitude being probably 20°. Three minutes later, at 5.30 p.m., I heard a low, distant, rumbling sound, which was not improbably the report of its explosion.

G. M. WHIPPLE

Kew Observatory, Richmond, Surrey, December 11

Physical Society, November 10

UNDER the above heading in *NATURE* of Nov. 15, p. 71, I notice it is stated that I have found the velocity of sound in air

to be about 320 metres per second. This is manifestly a misprint for 330 metres, but I should like to state that as far as my experiments have gone the value for free air is not determined, although 330·6, Regnault's value, is probably very nearly what my method would make it.

D. J. BLAICKLEY

103, Iverson Road, West Hampstead, N.W., December 10

The Ophidian Genus "Simotes"

MY attention has just been drawn to a note by Mr. H. O. Forbes, published under the heading "The Genus *Simotes* of Snakes," in NATURE, vol. xxviii. p. 539, in which he states that, when describing a new species of *Simotes* discovered by him in Timor-Laut (P.Z.S. 1883) and which I observed was the first of the genus known to occur eastward of Java, I overlooked Krefft's *Simotes australis* from Port Curtis, described in P.Z.S. 1864. It is a well known fact, pointed out by Dr. Günther in 1865 (Zool. Rec. i.) and since admitted by Krefft himself ("The Snakes of Australia"), that *Simotes australis* is not a species of that innocuous genus, but belongs to a widely different family of poisonous snakes and to the genus *Brachyurophis*.

London, December 5

G. A. BOULENGER

THE REMARKABLE SUNSETS

WE have received the following further communications on this subject:—

HAVING been rather too persistently of late requested to explain both the why, and whence, and even the future influences, of the recent very red and brilliant sunsets, I gladly take the opportunity of addressing to NATURE the few remarks I have to make on the actual facts and their proximate causes.

In all truth the sunsets through the last week of November and first four or five days of December have been remarkably fine, and consecutively so numerous. But each one, in so far as I have observed, was but an intensification, and sometimes not much of that, of whatever goes to make up an ordinarily fine sunset, as customary to that season of the year and that direction of wind with its concomitant kind of clouds.

The season of the year not only causes the fiery show to last longer than at many other times but enables it to take place while pedestrians are still engaged in their constitutional afternoon walks in pleasant autumn temperature, and before they shut themselves up for the evening in their comfortable homes with artificial lights around them.

Some thirty years ago I used to spend every evening month after month, at the ordinary dinner hour of others, in the open air, watching for, and when seen making quick coloured drawings of, any exceptionally fine sunset; taking in this way three or four completely separate pictures on the same evening between the time of the sun vulgarly going down beneath the horizon, and at the last the stars coming out in the darkness after the last vestige of twilight or high illuminated cirrus-cloud had disappeared.

In this manner I came to know practically that the so-called after-glow, which has been alarming so many persons within the last few days, whenever the temporary disposition and arrangement of the clouds and vapour in the air allow it to appear, is always more richly coloured in reds of various kinds than any of the earlier glows and more luminous splendours; and that the number of modifications which any one sunset may go through, or the number of different pictures it may make up, according to changes in the clouds both above and below the horizon, is bewildering. But the grandest effects, the nearest approaches to the sublime, were always those when the general light in the air was either so faint, or so monochromatic, that the pigments in the colour box could not be distinguished one from another without the aid of artificial light.

On December 3 and 4 of this week, on setting myself

to watch and note with my former apparatus, I found all these bizarre effects of colour and form in their old intensity and their old kaleidoscopic quickness of change. On the 3rd especially the reds were so powerful at certain times, and the air so clear between me and them, that the young crescent moon, though low down in the sky, shone by contrast to the scarlet cloudlets around it with a sort of supernatural lustre of blue silver; while the gas-lights under the same contrast, though in reality a gross beery brown in colour, appeared of a delicate sulphur, almost greenish, yellow. Those clouds, therefore, were so red in consequence of something that had happened to the sunlight illumining them which had not happened to that illumining the moon. What was it then? Simply that the lower atmosphere of the earth was so particularly clear of dust, haze, vapour, fogs, and positive obstructions of lower clouds that the sun, though at the time a long way below the horizon, was enabled to send its rays through an unusual length of atmospheric path without experiencing any other diminution than merely the specific elimination of those particular rays in its spectrum-quiver to which the atmosphere, in that particular condition, is antagonistic, leaving the field of glory to others alone.

Had the wind been south-west, the stoppage would have been chiefly amongst and of the red rays of light, where the black water-vapour lines are so numerous, chiefly below D, near C, and especially about the region of little "a," which then becomes of giant size. But the wind having been really north-west, the air was dry, water-vapour lines practically absent, and, as Col. Donnelly most correctly remarked in this week's NATURE (p. 132), the dry air band above D in the citron, and usually called the low sun band in meteorological spectroscopy, was at an immense maximum. Red light was therefore practically unimpeded, green and blue much interfered with, and more and more with every successive instant of further descent of the sun below the horizon. So thus it was that the spectroscope told at any instant through all the varied displays that that coloured light so much admired was simply sunlight that had passed through an extra length of extra-dry air, and was being reflected at the last from thin clouds at an extra height in the atmosphere, where water-vapour is always at a minimum.

But the sunset of December 5 was very different. In the course of the evening there were two or three distinct attempts, as it were, for the clouds to assume red hues, but they lasted for only a few seconds each; and though some aspects of the scene were very fine pictorially, it had to be classed as a "yellow sunset." Next day showed the cause of that in the wind below, as well as above, turning round to east of north. December 6 and 7 had poorer and poorer sunsets of both a yellow and sickly type, and December 8 with a south-west wind has brought in rain.

Thus seems to have ended for the time this fine series of Nature's evening pyrotechnic displays in the west (a similar set having also been witnessed during the mornings in the east); but demands are still made for an explanation of why, and to what end? If we should reply that, given a clear air, not too many clouds, and these high up in the atmosphere and with surfaces well constituted for reflection, the sunsets will always be fine; and that they will be varied exceedingly in their beauty even from moment to moment, according to the exquisite manner in which clouds and cloudlets of cirrus streamers form and dissolve and form again in all varieties of shape and size and density, according to mere temperature changes and other ordinary meteorological conditions of the air; that is not enough to satisfy the present temper of the public, who seem screwed up to a pitch of nervous alarm that what they have been seeing, though to them it has been like "music which gives delight and hurts not," may yet have something to do with the green and